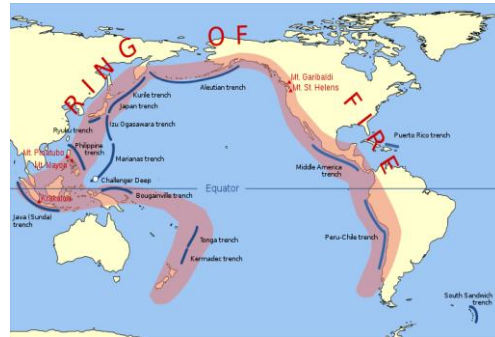
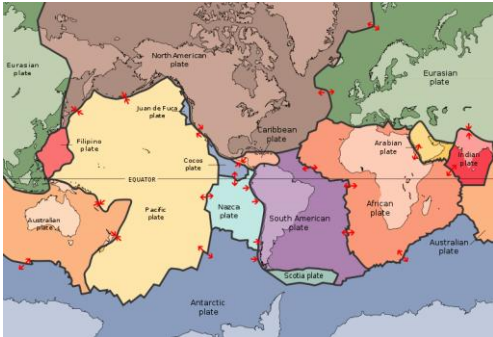


Earth Science - Final Review

Directions: On the squares provided, show **EVIDENCE** that you **KNOW** the following topics:

1. **Know** why the edge of the Pacific Plate sees so many volcanoes.

- Space Holder

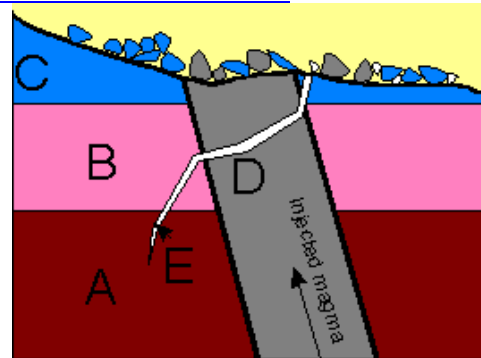
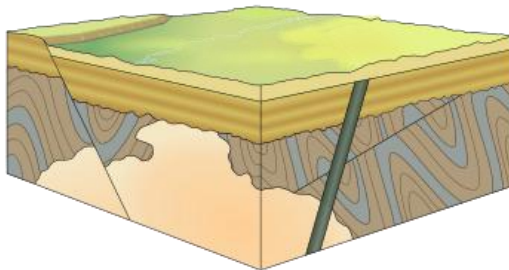


2. **Know** the difference between magma and lava.

- Magma... molten rock under the ground
- Lava... molten rock above the ground

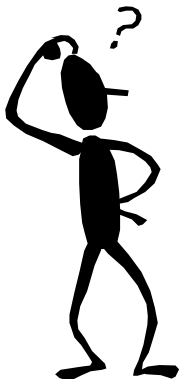
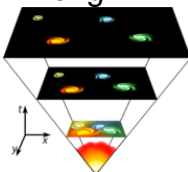
3. **Know** the Principal of Cross-Cutting Relationships

- Dike/Sill intrusive igneous rock formations
- Layering of sedimentary rock for relative dating
- http://www.ask.com/fr?q=Isotope&desturi=http%3A%2F%2Ffaculty.weber.edu%2Fbdattilo%2Fshknbk%2Fnotes%2Ftime.htm&fm=i&ac=169&ftURI=http%3A%2F%2Fwww.ask.com%2Ffr%3Fq%3DIsotope%26desturi%3Dhttp%253A%252F%252Ffaculty.weber.edu%252Fbdattilo%252Fshknbk%252Fnotes%252Ftime.htm%26imagesrc%3Dhttp%253A%252F%252Ffaculty.weber.edu%252Fbdattilo%252Fimages%252Ftim_isoth.gif%26thumbsrc%3Dhttp%253A%252F%252Fsp.ask.com%252Fsa%252Fi%252Fsc%252Fcl%252Fisotopes.jpg%26fn%3Dtim_isoth.gif%26o%3D41647999%26i%3Ddir%26f%3D2%26fm%3Di%26ftbURI%3Dhttp%253A%252F%252Fwww.ask.com%252Fweb%253Fq%253DIsotope%2526o%253D41647999%2526i%253Ddir



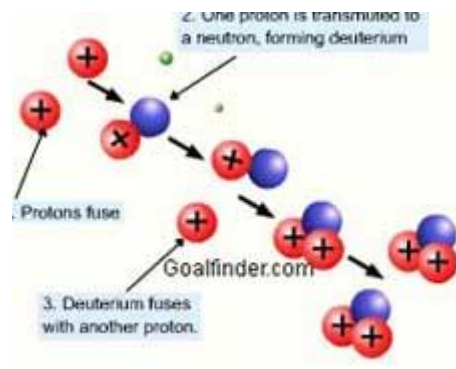
4. **Know** the current theory for the formation of the Universe

- Big-Bang states...
- The universe is ever expanding and started form an extremely hot dense origin



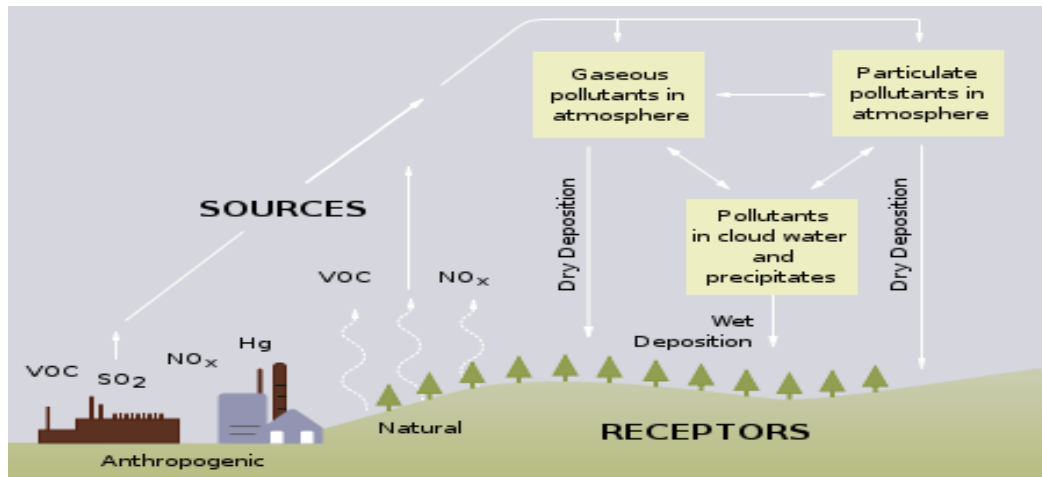
5. **Know** the process that creates the sun's energy

- Nuclear Fusion...

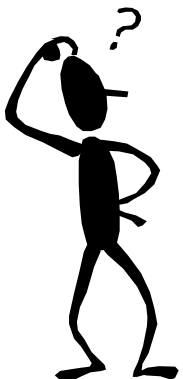
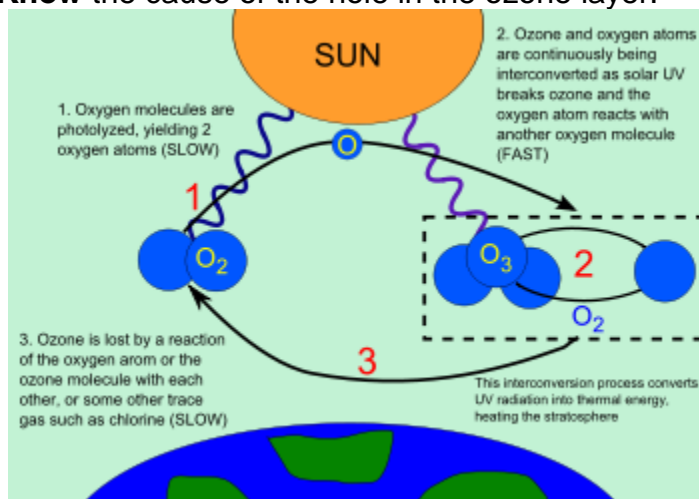


6. **Know** the cause of acid rain

- Space holder



7. **Know** the cause of the hole in the ozone layer.



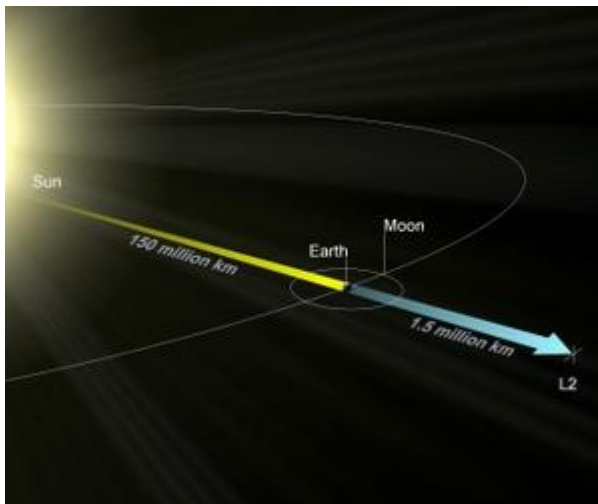
8. **Know** what a submergent coastline is

- **Submergent coastlines** are stretches along the coast that have been inundated by the sea due to a relative rise in sea levels. This occurs due to either [isostasy](#) or [eustasy](#).



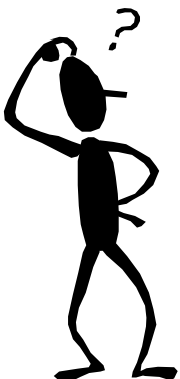
9. **Know** the shape of the Earth's orbit around the Sun

- Elliptical... two foci
- Circular... one central point



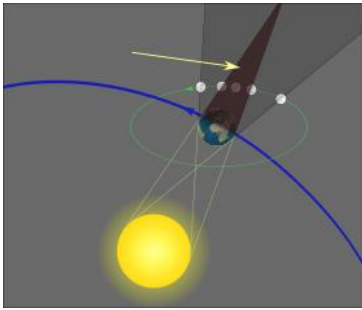
10. **Know** who proposed the geocentric solar system model

- Ptolemy...

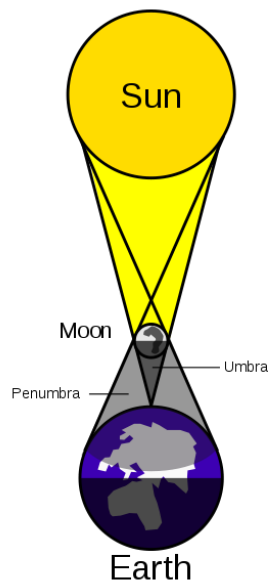


11. Know the difference between lunar and solar eclipses

- Lunar



- Solar



12. Know what factors determine the pull of gravity

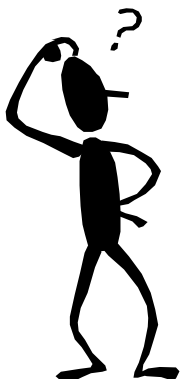
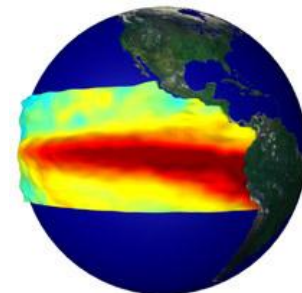
- If you have to have the formula, it's $F = G (m_1 m_2) / r^2$

Read more:

[http://wiki.answers.com/Q/What are the factors that affect the strength of gravity#ixzz1LVCrMG1P](http://wiki.answers.com/Q/What_are_the_factors_that_affect_the_strength_of_gravity#ixzz1LVCrMG1P)

13. Know what El Nino is

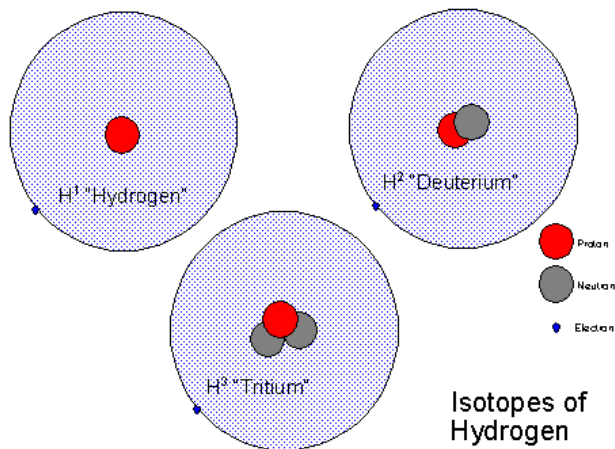
- Pacific ocean
- Temperature that effects global weather patterns





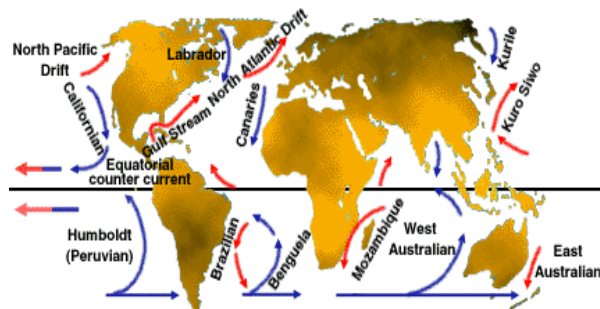
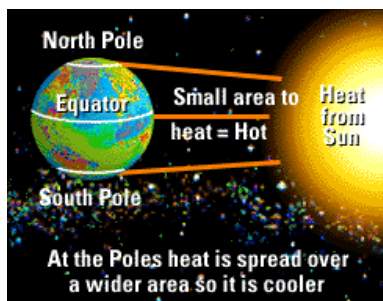
14. Know what an isotope is,

- Isotopes have the same atomic number but different mass numbers.



15. Know what determines the climate of an area.

- The factors are:
 - Distance from the sea
 - Ocean currents
 - Direction of prevailing winds
 - Relief
 - Proximity to the equator
 - The El Nino phenomenon
 - Recently it has accepted that Human activity is also affecting climate.
 - Location
- http://wiki.answers.com/Q/What_factors_determine_climate#ixzz1Kf2knuW6
- Read more:



16. Know the properties to test minerals.

Color--The color of the specimen as it appears to the naked eye under normal lighting conditions. Some minerals such as gold will only appear as one color, but due to impurities and crystal light distortion, many minerals can appear in multiple colors. Therefore, observable specimen color is the least effective property in identification.

Streak--The color of a mineral in powdered form. A streak test is performed by dragging a freshly

cleaved mineral surface across an unglazed porcelain surface. If the mineral is less hard than the porcelain, it will leave a stripe of color (the mineral in a powdered state). This is the true color of a mineral specimen as it lessens the impurity impact and eliminates the light distortion from the crystal. Although a mineral may have multiple observable specimen colors, it will only have one streak color.

Luster--Refers to the absorption, reflection, or refraction of light by the surface of a mineral. Minerals possess various lusters that are somewhat self-explanatory such as dull, earthy, adamantine, metallic, glassy, metallic, silky, greasy, pearly, and resinous.

Fluorescence--Some minerals fluoresce in ultraviolet light, and some minerals specimens may appear to fluoresce due to fluorescent mineral impurities, or due to locality. This is not an extremely reliable indicator property but can be used in conjunction with other identification properties.

Chemical Composition--Minerals are chemicals, either elements or compounds found naturally in the Earth. Some minerals have a fixed chemical composition, and some minerals have a rigid set of chemical composition parameters that allow for the replacement of certain elements with other elements. Chemical properties can be tested with the use of a blowpipe, flame color, bead test, and laboratory solution tests.

Hardness--Minerals are identified roughly by their hardness based on the Mohs scale of mineral hardness, a list of ten minerals from #1 (softest) to #10 (hardest). All minerals will fall somewhere along the scale, based on their ability to scratch any mineral with a number lower than theirs and their inability to scratch any mineral with a number higher than theirs.

Mohs Scale of Mineral Hardness

1. Talc
2. Gypsum
3. Calcite
4. Fluorite
5. Apatite
6. Orthoclase
7. Quartz
8. Topaz
9. Corundum
10. Diamond

Specific Gravity--Is the relative weight of a mineral as compared to the weight of an equal volume of water. The specific gravity is also referred to as density and is expressed normally as an average of a small range of densities.

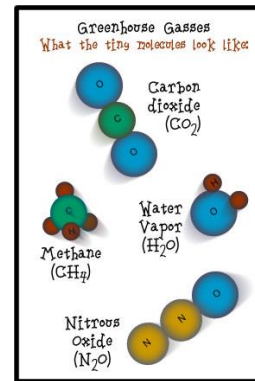
Some Common Minerals and Their Specific Gravity

- | | |
|-----------------|-------------------------|
| 1. Halite (2.1) | 5. Muscovite Mica (2.8) |
| 2. Gypsum (2.3) | 6. Corundum (4.0) |
| 3. Quartz (2.7) | 7. Cinnabar (8.0) |
| 4. Talc (2.8) | 8. Gold (19.3) |

Read more: http://wiki.answers.com/Q/What_properties_or_tests_are_used_to_identify_minerals#ixzz1LVENpv2g

17. Know the main greenhouse gas.

- Methane
- Carbon Dioxide
- Water Vapor
- Trap heat in the environment
- <http://eo.ucar.edu/kids/green/warming4.htm>



18. Know what gases make up our atmosphere.

- Gases in atmosphere Nitrogen (N₂) 78.084% Oxygen (O₂) 20.946% Argon (Ar) 0.934% Carbon dioxide (CO₂) 0.0383 % Neon (Ne) 0.001818 % Helium (He) 0.000524 % Methane (CH₄) 0.0001745 % Krypton (Kr) 0.000114% Hydrogen (H₂) 0.000055 % There is also a varying amount of water vapor, depending on the altitude...

19. Know what causes ocean currents to move.

- The four factors that cause ocean currents:
- (1) Planet rotation,
- (2) Wind,
- (3) Density of the water (depends on temperature and salinity), and
- (4) Gravitation of the moon and earth Direction and strength depends on the shape of the shoreline, depth and shape of the bottom, and other currents.

20. Know the 3 types of heat transfer.

- Conduction, convection, radiation
- Conduction: The transfer of energy by collisions between the atoms and molecules in a material.
- Convection: Transfers heat when particles move between objects or areas that differ in temperature.
- Radiation: The transfer of energy by waves.

21. Know the cause of the Coriolis effect.

- The apparent deflection (Coriolis acceleration) of a body in motion with respect to the earth, as seen by an observer on the earth, attributed to a fictitious force (Coriolis force) but actually caused by the rotation of the earth and appearing as a deflection.

22. Know how to determine the phases on the moon

- The angle between the earth, moon and sun determines the phase of the moon.
- The side of the moon facing the sun is always illuminated while the side of the moon facing away from the sun is always dark.
- The amount of light side and dark side showing on the side of the moon facing the Earth changes as the moon orbits Earth.
- A new moon appears as a dark silhouette of the moon when Earth is behind the moon in relation to the Sun.
- A completely illuminated, or full moon, occurs when Earth is in front of the moon in relation to the Sun, allowing an observer on Earth to see the sunlit side of the moon.
- Due to the nearly monthlong orbit of the moon, various intermediate stages of illumination may be seen.

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- Waxing vs. Waning moon

Read more: [How to Determine Moon Phases | eHow.com](http://www.ehow.com/how_5831427_determine-moon-phases.html#ixzz1M0OPBp9C)
http://www.ehow.com/how_5831427_determine-moon-phases.html#ixzz1M0OPBp9C

23. Know why the Cenozoic is an important geologic era.

Preceded by <u>Proterozoic Eon</u>	542 Ma - <u>Phanerozoic Eon</u> - Present									
	542 Ma - <u>Paleozoic Era</u> - 251 Ma					251 Ma - <u>Mesozoic Era</u> - 65 Ma		65 Ma - <u>Cenozoic Era</u> - Present		
	<u>Cambrian</u>	<u>Ordovician</u>	<u>Silurian</u>	<u>Devonian</u>	<u>Carboniferous</u>	<u>Permian</u>	<u>Triassic</u>	<u>Jurassic</u>	<u>Cretaceous</u>	<u>Paleogene</u> <u>Neogene</u> <u>Quaternary</u>

24. Know what geologic time division is the longest and shortest.

- Space Holder

EON/ERA	PERIOD	EPOCH	Ma
Phanerozoic	Cenozoic	Quaternary	
		Pleistocene	Late 0.01
			0.8
			2.6
		Pliocene	Late 3.6
			5.3
			11.6
		Miocene	Late 16.0
			23.0
		Oligocene	Late 28.4
	Tertiary		33.9
		Eocene	Late 40.6
			48.6
			55.8
		Paleocene	Late 58.7
	Mesozoic		61.7
			65.5
		Cretaceous	Late 99.6
			145.5
			161
	Paleozoic	Jurassic	Late 176
			201.6
		Triassic	Late 235
			245
			251.6
Precambrian	Proterozoic	Permian	Late 260
			271
			299
		Carboniferous	Late 318
			359
	Archaean	Pennsylvanian	Late 385
			398
			416
		Devonian	Late 423
			428
	Hadaean	Silurian	Late 444
			461
		Ordovician	Late 472
			488
		Cambrian	Late 501
	Proterozoic		510
			521
			542
			1000
			1600
			2500
			3200
			3850

25. Know why the Mesozoic Era is important

- The **Mesozoic Era** is an interval of geological time from about 250 million years ago to about 65 million years ago.
- It is called the Age of [Dinosaurs](#) because of its association with non-avian dinosaurs.
- The [Chicxulub impact](#) and other events ended the era when a majority of species on earth went extinct.

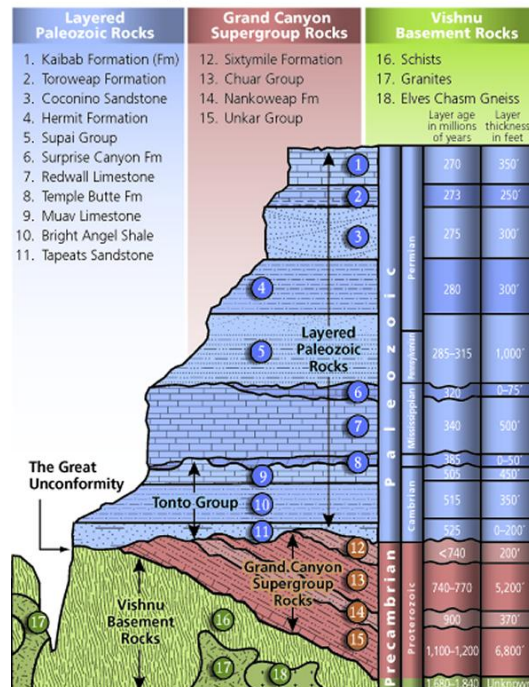
26. Know how old the earth is.

- **[SCIENTIFIC AGE OF THE EARTH](#)**
- Before analyzing the arguments advanced by creation “scientists” for a very young Earth, I here summarize briefly the evidence that has convinced scientists that the Earth is 4.5 to 4.6 billion years old.

27. Know what absolute dating is and the methods to do it.

- Absolute dating is used in archaeology or paleontology to determine the specific date of a site or artifact, usually through physical or chemical analysis. Unlike other forms of dating such as relative or radiocarbon dating, absolute dating provides a numerical age, rather than a sequence of age.
- Relative dating is a dating technique which tries to determine the relative order of past events or the age of an artifact based on factors such as location, type, similarity (to other objects) and stratigraphic information.

Grand Canyon's Three Sets of Rocks



28. Know the shape of valleys created by glaciers

- Glacially eroded valleys are normally U-shaped.



29. Know why convection is important

- Convection currents transfer heat from one place to another by mass motion of a fluid such as water, air or molten rock.
- The heat transfer function of convection currents drives the earth's ocean currents, atmospheric weather and geology.
- Convection is different from conduction, which is a transfer of heat between substances in direct contact with each other.
- Read more: [What Are Convection Currents? | eHow.com](http://www.ehow.com/info_8172073_convection-currents.html#ixzz1M0aimjR9)
http://www.ehow.com/info_8172073_convection-currents.html#ixzz1M0aimjR9

30. Know why seafloor spreading is important

- process in which new ocean floor is created as molten material from the earth's mantle rises in margins between plates or ridges and spreads out

31. Know what ice wedging is

- ice wedging is when water or snow gets in a crack and has nowhere to go but it has to go somewhere so it expands and the crack gets larger! And soon after that crack expands enough that the piece of land falls off
- Read more: http://wiki.answers.com/Q/What_does_ice_wedging_mean#ixzz1M0cUMTXR



32. Know the shape of rocks that have been exposed to running water

- Rushing water, like what you find in rivers that move quickly in the mountains or strong waves on the shores of oceans, roll rocks around. This causes the sharp edges of the rocks to get knocked off & that is why river rocks are so smooth & beach pebbles look polished.

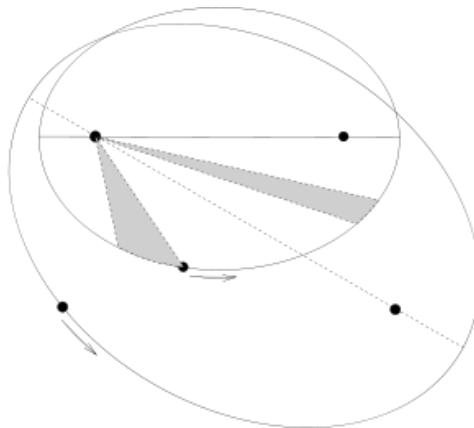
33. Know who proposed Continental Drift

- the Theory of Plate Tectonics, which came from the re-evaluation of the Continental Drift hypothesis. In 1915, Alfred Wegener (german meteorologist) proposed that there were 4 pieces of evidence to support his Continental Drift hypothesis:

- The Continental Puzzle
(matching coastlines, for ex- South America & Africa).
- 2) Matching Fossils
(fossil organisms found on different landmasses, for ex- Mesosaurus fossils found both on southeastern South America & on southwestern Africa).
- 3) Rock Types & Structures
(mountain belts that end at one coastline & reappear on another coastline across the ocean, for ex- similar rocks & structures found both in the Appalachian mountain belt & in the British Isles & Scandinavia).
- 4) Ancient Climates
(layers of glacial deposits from continental glaciers found in southern Africa & in South America & also in India & Australia).

34. Know who proposed the laws of planetary motion

- Joannes Kepler – 1600 German Mathematician\

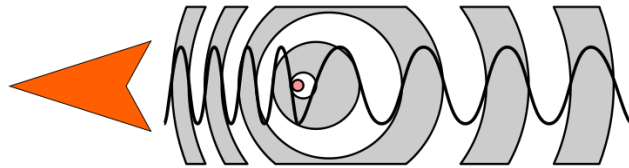


- 1st Law - The orbit of every planet is an ellipse with the Sun at one of the two foci
- 2nd Law - A line joining a planet and the Sun sweeps out equal areas during equal intervals of time
- 3rd Law - The square of the orbital period of a planet is directly proportional to the cube of the semi-major axis of its orbit



35. Know why Doppler radar is important

- radar tracking system that determines the velocity of a moving object by measuring the Doppler shift of the frequency of a radar signal reflected by the object
- A **Doppler radar** is a specialized [radar](#) that makes use of the [doppler effect](#) to produce velocity data about objects at a distance. It does this by beaming a [microwave](#) signal towards a desired target and listening for its reflection, then analyzing how the frequency of the returned signal has been altered by the object's motion. This variation gives direct and highly accurate measurements of the [radial](#) component of a target's velocity relative to the radar. Doppler radars are used in [aviation](#), sounding satellites, [meteorology](#), [police speed guns](#),^[1] and [radiology](#).



36. Know what causes the seasons

- The seasons are caused by the tilt of the Earth's rotational axis away or toward the sun as it travels through its year-long path around the sun.



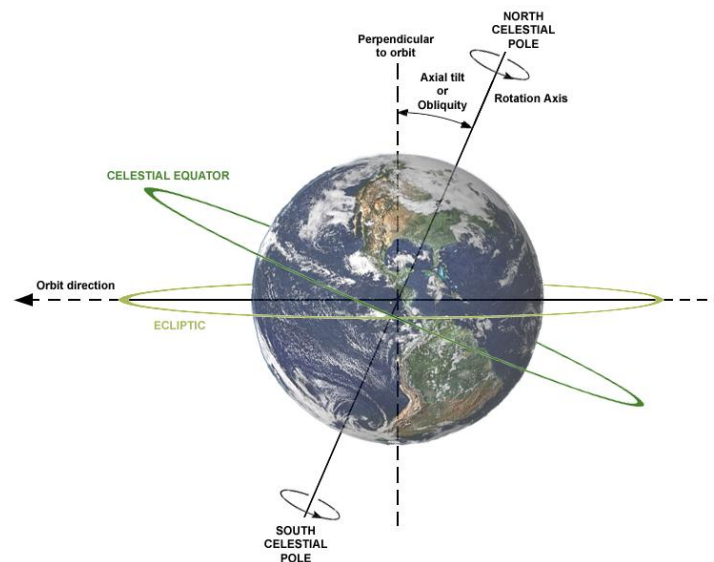
37. Know the lines of latitude associated with the solstices

- The Tropic of Cancer
- The Tropic of Cancer is located at approximately 23.5 degrees north latitude, or 23.5 degrees north of the Equator. This line of latitude is the north boundary of the area referred to as the tropics. During the summer solstice the sun is located immediately above the Tropic of Cancer. This line is the point farthest to the north at which the sun is hanging directly upward at noon.
- The Tropic of Capricorn
- The Tropic of Capricorn is located at approximately 23.5 degrees south latitude, or 23.5 degrees south of the Equator. This line of latitude is the south boundary of the area referred to as the tropics. This line marks the point farthest to the south at which the sun is hanging directly upward at noon. During the summer solstice of the Southern Hemisphere, the sun is located immediately above the Tropic of Capricorn.

- Read more: [What Are the Five Major Lines of Latitude? | eHow.com](http://www.ehow.com/list_7581614_five-major-lines-latitude.html#ixzz1M0jqPMrO)
http://www.ehow.com/list_7581614_five-major-lines-latitude.html#ixzz1M0jqPMrO

38. Know the lines of latitude associated with the equinoxes

- An **equinox** occurs twice a year, when the tilt of the [Earth's](#) axis is inclined neither away from nor towards the [Sun](#), the center of the Sun being in the same plane as the Earth's [equator](#). The term *equinox* can also be used in a broader sense, meaning the date when such a passage happens. The name "equinox" is derived from the Latin *aequus* (equal) and *nox* (night), because around the equinox, the night and day have approximately equal length.
- At an equinox, the Sun is at one of two opposite points on the [celestial sphere](#) where the [celestial equator](#) (i.e. declination 0) and [ecliptic](#) intersect. These points of intersection are called **equinoctial points**: classically, the **vernal point** and the **autumnal point**. By extension, the term *equinox* may denote an equinoctial point.
- An equinox happens each year at two specific moments in time (rather than two whole days), when there is a location (the [subsolar point](#)) on the Earth's equator, where the center of the Sun can be observed to be vertically overhead, occurring around March 20/21 and September 22/23 each year.
- Although the word *equinox* is often understood to mean "equal [day and] night," this is not strictly true. For most locations on earth, there are two distinct identifiable days per year when the length of day and night are closest to being equal; those days are referred to as the "equiluxes" to distinguish them from the equinoxes. Equinoxes are points in time, but equiluxes are days. By convention, equiluxes are the days where sunrise and sunset are closest to being exactly 12 hours apart. ^{[2][3]}



39. **Know** when spring and neap tides occur

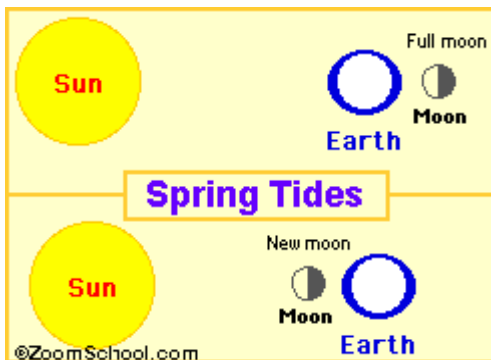
- **Spring Tides**

Spring tides are especially strong tides (they do not have anything to do with the season Spring). They occur when the Earth, the [Sun](#), and the Moon are in a line. The gravitational forces of the Moon and the Sun both contribute to the tides. Spring tides occur during the full moon and the new moon.

- The **Proxigean Spring Tide** is a rare, unusually high tide. This ☐ very high tide occurs when the moon is both unusually close to the [Earth](#) (at its closest [perigee](#), called the [proxigee](#)) and in the New Moon phase (when the Moon is between the Sun and the Earth). The proxigean spring tide occurs at most [once every 1.5 years](#).

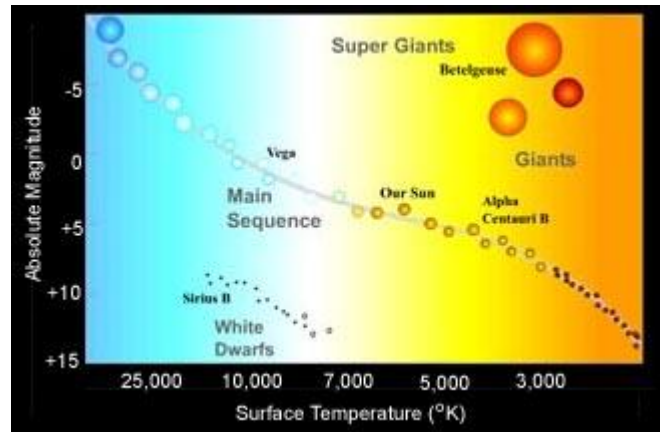
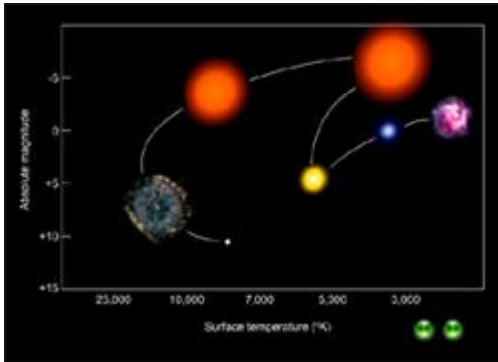
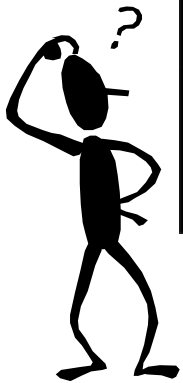
- **Neap Tides**

Neap tides are especially weak tides. They occur when the gravitational forces of the Moon and the Sun are perpendicular to one another (with respect to the Earth). Neap tides occur during quarter moons.



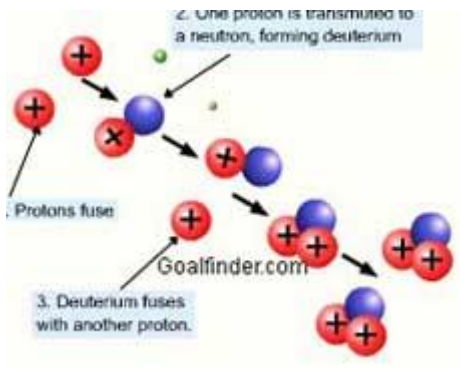
40. Know how to interpret a H-R Diagram

- Hertzsprung-Russell Diagram
- Sequence of stages a star under goes
- Relative features...star's color, temperature, and brightness and their relationship
- http://sunshine.chpc.utah.edu/labs/star_life/hr_interactive.html



41. Know how stars produce energy

- Nuclear Fusion...



42. Know why cumulonimbus clouds are scary!

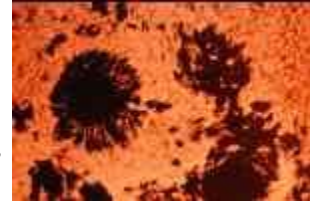
- Thunder storms come from these
- Could lead to tornados

43. Know the explosive features of the sun

- The Sun's power (about 386 billion billion megaWatts) is produced by nuclear fusion reactions. Each second about 700,000,000 tons of hydrogen are converted to about 695,000,000 tons of helium and 5,000,000 tons ($=3.86 \times 10^{33}$ ergs) of energy in the form of gamma rays. As it travels out toward the surface, the energy is continuously absorbed and re-emitted at lower and lower temperatures so that

by the time it reaches the surface, it is primarily visible light. For the last 20% of the way to the surface the energy is carried more by [convection](#) than by radiation.

- The surface of the Sun, called the **photosphere**, is at a [temperature](#) of about 5800 K. **Sunspots** are "cool" regions, only 3800 [K](#) (they look dark only by comparison with the surrounding regions). Sunspots can be very large, as much as 50,000 [km](#) in [diameter](#). Sunspots are caused by complicated and not very well understood interactions with the Sun's magnetic field.



- Read more about [The Sun 1. Sun Facts and images.](#) by [nineplanets.org](#)

